

WHAT IS CLAIMED IS:

1. A ball screw comprising:

a screw shaft having a first helical ball rolling groove in an outer periphery thereof;

a nut having a second helical ball rolling groove in an inner periphery thereof; and

a plurality of balls arranged in a helical raceway defined by the first and second helical ball rolling grooves,

wherein at least one of the first and second helical ball rolling grooves has a surface with a surface roughness of 0.12  $\mu\text{m}$  or less in average roughness (Ra) along a helical direction of the helical raceway.

2. The ball screw according to claim 1, wherein the first helical ball rolling grooves has the surface with a surface roughness of 0.12  $\mu\text{m}$  or less in average roughness (Ra) along a helical direction of the helical raceway.

3. The ball screw according to claim 1, wherein the second helical ball rolling grooves has the surface with a surface roughness of 0.12  $\mu\text{m}$  or less in average roughness (Ra) along a helical direction of the helical raceway.

4. The ball screw according to claim 2, wherein the

second helical ball rolling grooves has the surface with a surface roughness of 0.12  $\mu\text{m}$  or less in average roughness (Ra) along a helical direction of the helical raceway.

5            5. The ball screw according to claim 1, further comprising:

a retainer rotatably supporting the balls between the screw shaft and the nut,

10            wherein the retainer comprises a plurality of separators interposed between adjacent balls, each of the separators having concave surfaces on both sides thereof.

6. The ball screw according to claim 1, further comprising:

15            a retainer rotatably supporting the balls between the screw shaft and the nut,

20            wherein the retainer comprises a plurality of pockets for rotatably holding the balls respectively, each of pockets having concave surfaces between which each of said balls is interposed.

7. The ball screw according to claim 1, wherein each of the balls has an outer diameter of 3.969 mm or less.

25            8. The ball screw according to claim 2, wherein each

of the balls has an outer diameter of 3.969 mm or less.

9. The ball screw according to claim 3, wherein each of the balls has an outer diameter of 3.969 mm or less.

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10. The ball screw according to claim 4, wherein each of the balls has an outer diameter of 3.969 mm or less.

11. The ball screw according to claim 7, wherein  
10 each of the balls has an outer diameter of 2.000 mm or more.

12. The ball screw according to claim 8, wherein each of the balls has an outer diameter of 2.000 mm or more.

13. The ball screw according to claim 9, wherein  
15 each of the balls has an outer diameter of 2.000 mm or more.

14. The ball screw according to claim 10, wherein each of the balls has an outer diameter of 2.000 mm or more.

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15. The ball screw according to claim 1, wherein the screw shaft has an outer diameter of 32 mm or less.

16. The ball screw according to claim 1, further  
25 comprising:

a retainer rotatably supporting the balls between the screw shaft and the nut.

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